VERIFICATION OF TRANSLATION

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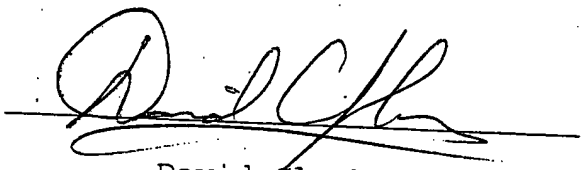
Signature 

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Hand-Held Power Tool With Replaceable Tool Fitting

Prior Art

There is a need for a hand-held power tool, for example a rotary drill, with a tool fitting that can be quickly and easily replaced. It ought to be possible either to change between two different tool fittings or to exchange a worn tool fitting for a new one. These tool fittings can be for drill bits and chisels used for impact drilling and chiseling in stone or they can be for screwdriving and non-impact drilling in steel and wood. Tools with system insert ends (e.g. SDS-plus) or with round or hexagonal insert ends can be inserted into the tool fittings.

A hand-held power tool with a replaceable tool fitting is known, for example, from DE 196 21 610 A1. In it, the output spindle onto which the tool fitting can be placed has a number of profiled bodies and the tool fitting is provided with profiled recesses into which the profiled bodies can engage in detent fashion, thus securing the tool fitting axially in relation to the output spindle. The rotary drive between the output spindle and the tool fitting is achieved by providing both parts with teeth that engage with one another. No actuation sleeve is required to place the tool fitting onto the output spindle. For the detent engagement of the tool fitting on the output spindle, care must be taken that the tool fitting is slid onto the output spindle at the correct rotation angle so that the profiled bodies find the profile recesses associated with them. This makes it more difficult to mount the tool fitting onto the hand-held power tool.

The object of the present invention is to embody the tool fitting and the output spindle so as to make it very easy to mount the tool fitting onto the hand-held power tool.

This object is attained with the defining characteristics of claim 1. According to these defining characteristics, it does not matter what rotation angle at which the tool fitting is mounted onto the machine. Despite this fact, the tool fitting finds its own way into the correct position for the detent engagement.

Advantageous modifications of the invention are disclosed in the dependent claims.

Drawings

The present invention will be explained in greater detail below in conjunction with an exemplary embodiment shown in the drawings.

Figs. 1 through 3 show a tool fitting in various stages of its being slid onto a hand-held power tool.

Description

As depicted in Fig. 1, the hand-held power tool, for example a rotary hammer, and the tool fitting that can be mounted onto it are embodied as follows: the rotary hammer has an output spindle 1 – embodied here in the form of a hammer tube 1, a receiving sleeve 2, a release sleeve 3, a compression spring 4, and a support ring 5. The hammer tube 1 has one or more profiled recesses 7 distributed over its circumference and one or more grooves 8 distributed over its circumference. The receiving sleeve 2, the release sleeve 3, the compression spring 4, the support ring 5, and a safety ring 10 for the support ring 5 can be embodied in the form of a preassembled unit that can be attached to the hammer tube 1 by means of a securing mechanism 9.

The compression spring 4 and a securing ring 10 hold the release sleeve 3 and the support ring 5 on the receiving sleeve 2 in an axially sliding fashion. In

addition to the above-mentioned elements, the tool fitting 11 has a dust protection cap 12, a protective sleeve 13, one or more fastening profiles 14 distributed over the circumference, and one or more profiled bodies 15 distributed over the circumference, which in the present exemplary embodiment, are embodied in the form of balls 15.

The profiled bodies 15 are supported in radially moving fashion in openings 16 in the tubular tool fitting 11 that can be slid onto the hammer tube 1. The shape of the profiled recesses 7 let into the hammer tube 1 is adapted to the shape of the profiled bodies 15 so that the profiled bodies 15 fit into the profiled recesses 7.

The mounting of the tool fitting 11 onto the rotary drill is described below.

– The tool fitting 11 is slid onto the hammer tube 1 until the at least one fastening profile 14 strikes against the shoulder 6 (see Fig. 2).

– The tool fitting 11 is rotated until the at least one fastening profile 14, sliding along the shoulder 6, engages in the at least one groove 8. The groove 8 is widened at its entry in order to facilitate insertion of the fastening profile 14. For example, the fastening profile 14 is a lug-shaped projection formed onto the inside of the tubular tool fitting 11.

– While the fastening profile 14 is traveling into the groove 8, it is possible for the tool fitting 11 to slide further, causing the at least one ball 15 to come into contact with the support ring 5 (see Fig. 3).

– As the tool fitting 11 is slid further, the at least one ball 15 slides the support ring 5 counter to the force of the compression spring 4 until the at least one ball 15 can travel into the profiled recess 7 (calotte).

– As soon as the at least one ball 15 travels into the profiled recess 7, the compression spring 4 slides the support ring 5 over the at least one ball 15.

– The at least one ball 15 acts as a rotary drive and serves to axially fix the tool fitting 11 in relation to the hammer tube 1 of the rotary hammer.

The means – fastening profile 14, profiled body 15 – provided on the tool fitting 11 in the exemplary embodiment shown and the means – profiled recess 7, groove 8 – provided on the hammer tube 1 of the hand-held power tool can also be swapped, namely the means on the tool fitting 11 can be provided on the hammer tube 1 and vice versa.

The above-described mounting of the tool fitting 11 onto the hammer tube 1 of the rotary hammer requires no actuation of the release sleeve 3. The low level of friction between the at least one fastening profile 14 on the tool fitting 11 and the shoulder 6 on the hammer tube 1 assures the engagement of the fastening profile 14 into the groove 8 despite the fact that the dust protection cap 12 and the protective sleeve 13 can rotate in relation to the tool fitting 11.

The above-described replaceable tool fitting has the following advantages: the rotary drive and axial fixing of the replaceable tool fitting 11 in relation to the hammer tube 1 of the rotary hammer occurs only by means of at least one ball 15, an associated opening 16, and a profiled recess 7 in the hammer tube 1. The tool fitting 11 can be slid onto the rotary hammer without having to actuate the release sleeve 3. The very low level of friction between the at least one fastening profile 14 on the tool fitting 11 and the shoulder 6 on the hammer tube 1 permits the protective cap 12, the protective sleeve 13, and the release ring 3 to be embodied as rotatable so that there is no danger of injury if the user inadvertently comes into contact or grasps these parts. Because the above-mentioned parts are rotatable, they also cannot be damaged by abrasion when they scrape against a work piece or a wall. Because the friction between the fastening profile 14 and the shoulder 6 of the hammer tube 1 is less than the rotation resistance of the protective cap 12 and the protective sleeve 13, the tool fitting can be engaged in detent fashion in its locking position by rotating and sliding the protective cap 12 and the protective sleeve 13.

The at least one profiled recess 7 and the at least one groove 8 can be situated in axial series with each other or offset from each other on the hammer tube 1. Situating them in axial series with each other has the advantage that the same tool can be used to produce the at least one ball recess 7 and the at least one groove 8. In conjunction with this, the at least one opening 16 and the at least one fastening profile 14 on the tool fitting 11 are likewise situated in axial series with each other or offset from each other.

The removal of the tool fitting 11 from the rotary hammer occurs as follows: the release sleeve 3 is pulled toward the rotary hammer, which causes the securing ring 10 to slide the support ring 5, releasing the at least one ball so that it can come out of the ball recess 7, after which the tool fitting 11 can be removed.